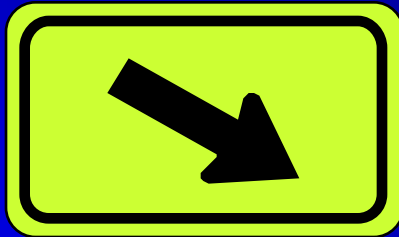


School Safety & Operations Session



Wednesday,
October 8, 2008

Join children and adults around the world
to celebrate the benefits of walking.

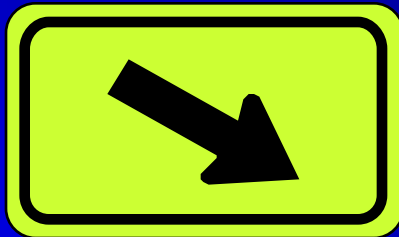
why walk?


International Walk to School is an annual event that promotes walking for several reasons:

- Physical activity
- Teaching safe walking skills to children
- Awareness of how walkable a community is and where improvements can be made
- Concern for the environment
- Reducing traffic congestion, pollution and speed near schools
- Taking back neighborhoods for people on foot
- Sharing time with community leaders, parents and children

get started at:
www.walktoschool.org

School Safety & Operations Session



 **iwalk**

International *in the* Walk to School **USA**

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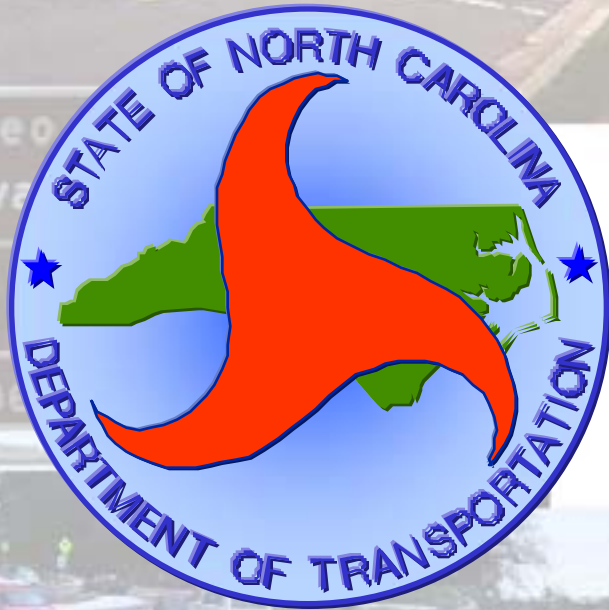
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Municipal and School



Transportation Assistance



Important School Considerations that are Frequently Overlooked



Current Process (sight plan review)

- **District Office will review driveway permit**
 - **Unnecessary driveways**
 - **Safe sight distance**
 - **Proper design for turn lane(s)**
 - **School Zone speed limit considerations**
- **What is not done:**
 - **Internal (campus) traffic operations**
 - **Student loading operations**
 - **Bus loading**
 - **Parking lot layout**
 - **Design characteristics for pedestrian/bike safety or security**

What is required of the schools?

Recent legislation requires school planners to make improvements if their design effects the safe ingress and egress to the State highway system.

Chapter 136.

Roads and Highways.

Article 1.

Organization of Department of Transportation.

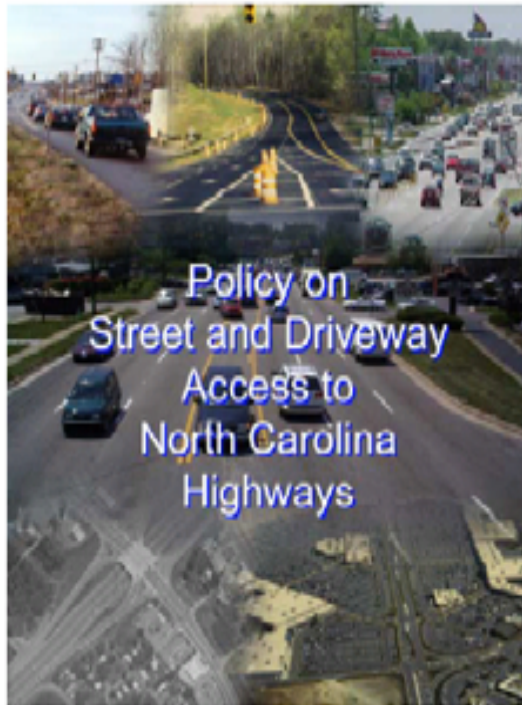
§ 136-18. Powers of Department of Transportation.

The said Department of Transportation shall be vested with the following powers:

(29a) To coordinate with all public and private entities planning schools to provide written recommendations and evaluations of driveway access and traffic operational and safety impacts on the State Highway system resulting from the development of the proposed sites. All public and private entities shall, upon acquiring land for a new school or prior to beginning construction of a new school, relocating a school, or expanding an existing school, request from the Department a written evaluation and written recommendations to ensure that all proposed access points comply with the criteria in the current North Carolina Department of Transportation 'Policy on Street and Driveway Access'. The Department shall provide the written evaluation and recommendations within a reasonable time, which shall not exceed 60 days. **This subdivision shall not be construed to require the public or private entities planning schools to meet the recommendations made by the Department, except those highway improvements that are required for safe ingress and egress to the State highway system.**



North Carolina Department of Transportation
July 2003

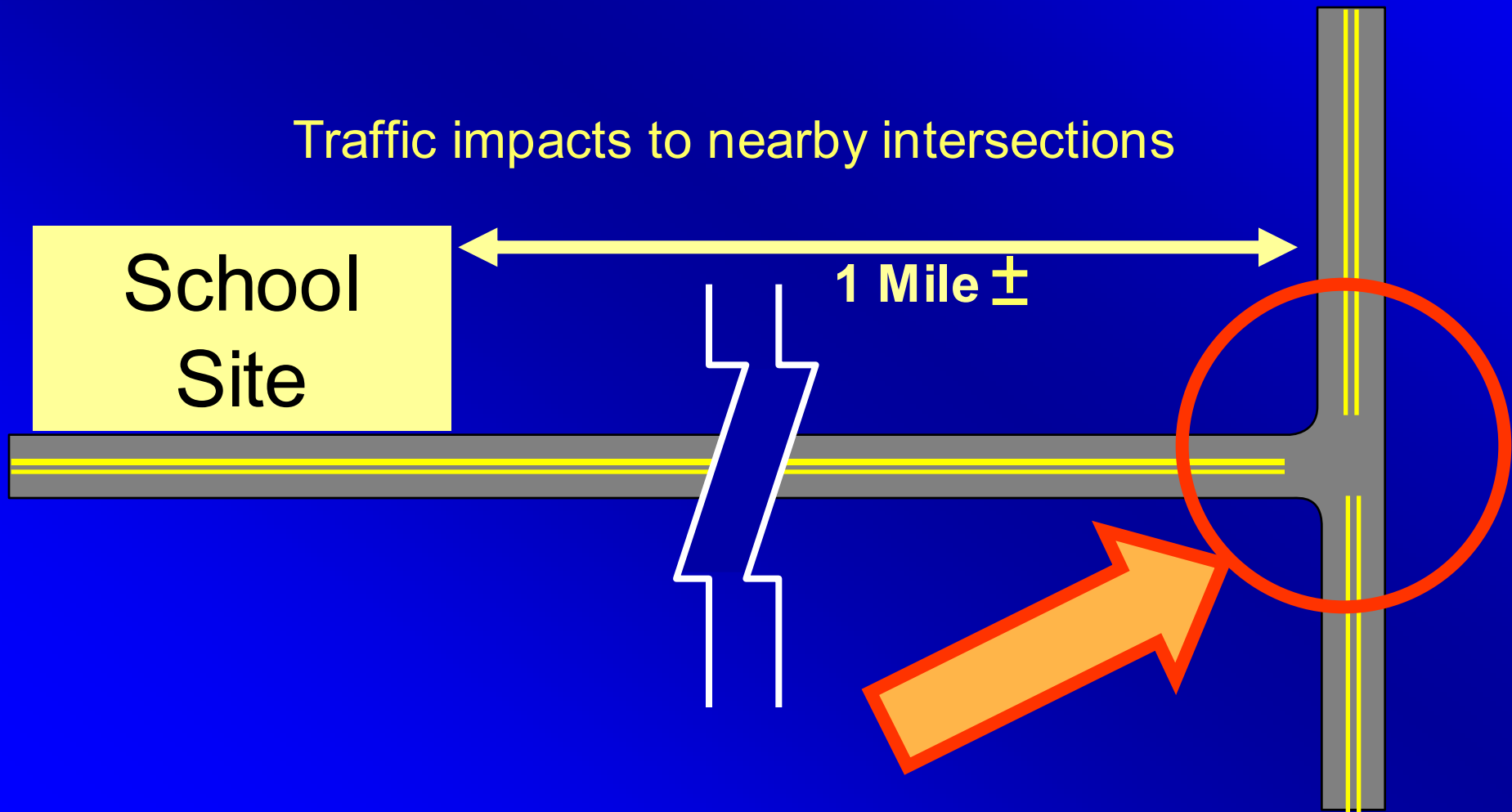


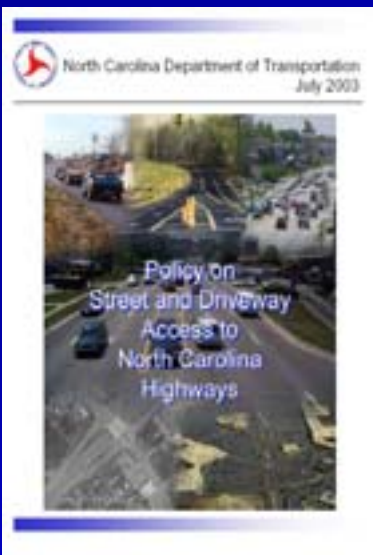
Policy on Street and Driveway Access to North Carolina Highways

“For schools, adequate storage for parental drop-off and pick-up areas should be provided entirely on the school campus site.”

Are Schools Responsible for Off-site Improvements?

Traffic impacts to nearby intersections





Off-Site Improvements

Traffic impacts to nearby intersections

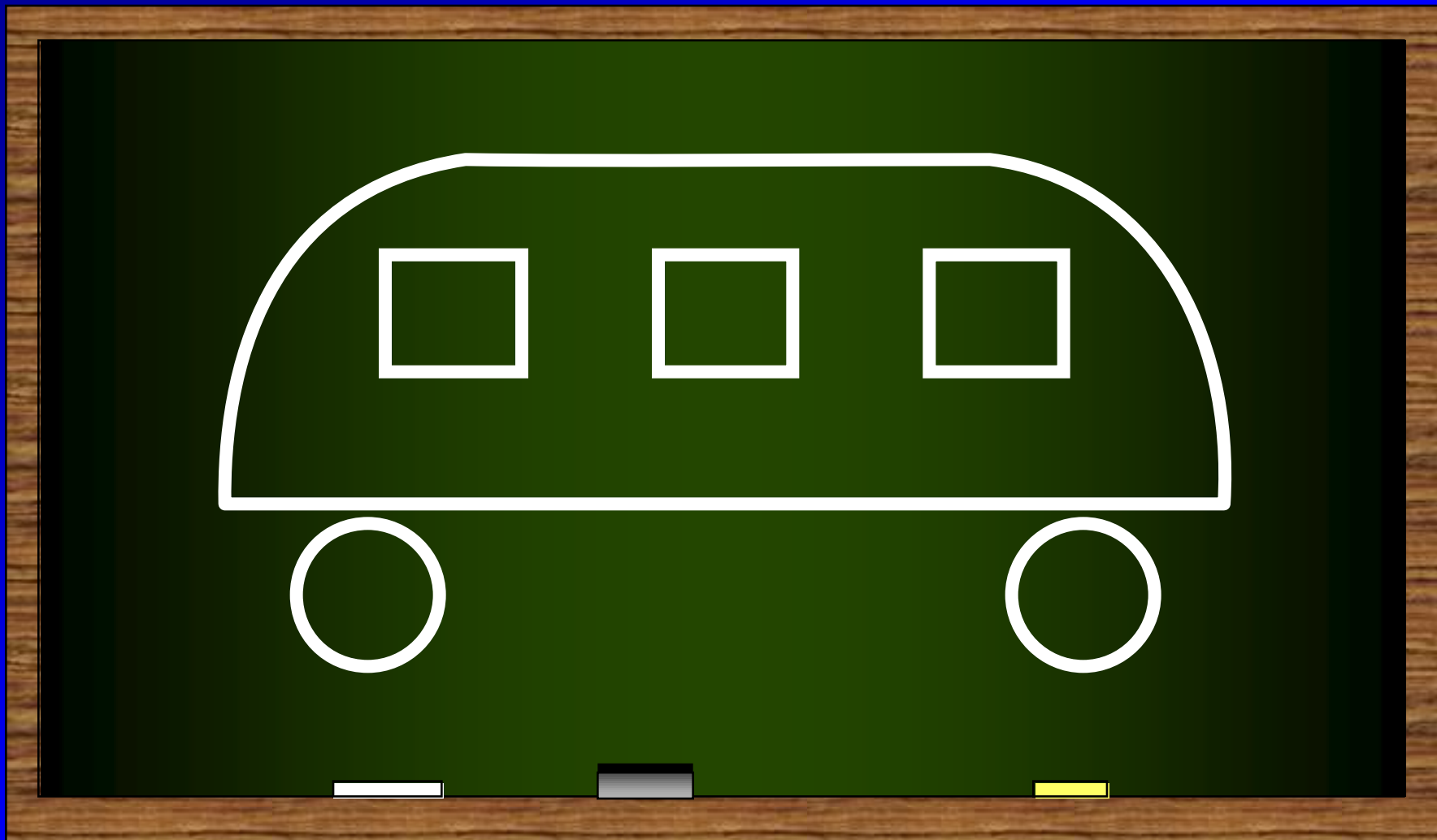
Policy On Street And Driveway Access to North Carolina Highways

The Department may require off-site improvements at locations not immediately adjacent to the property.

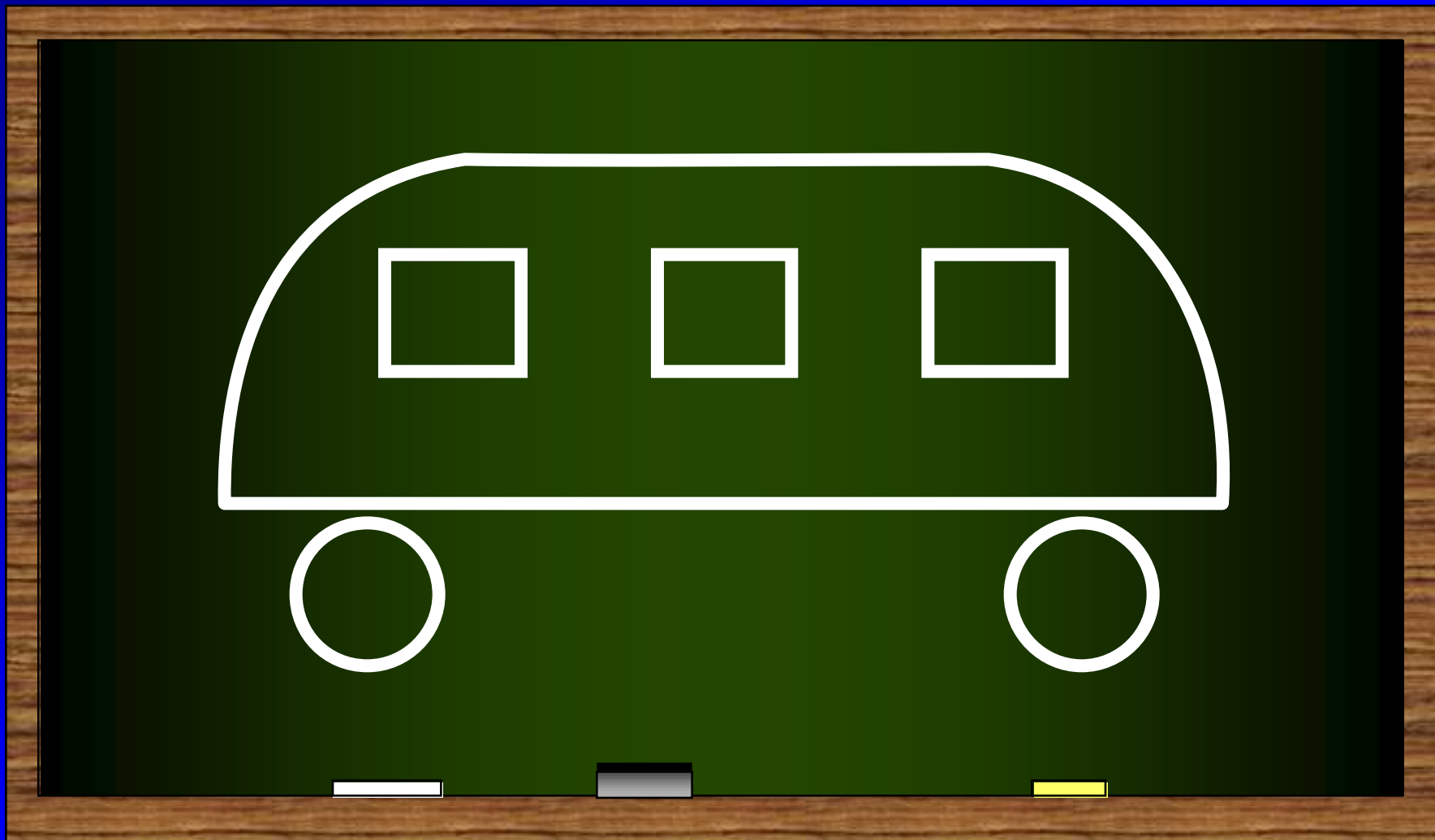
Justification:

Such off-site improvements are needed to improve public safety and traffic operational impacts caused by development site traffic. Examples of such off-site improvements are intersection improvements, adding new or upgrading existing signals.

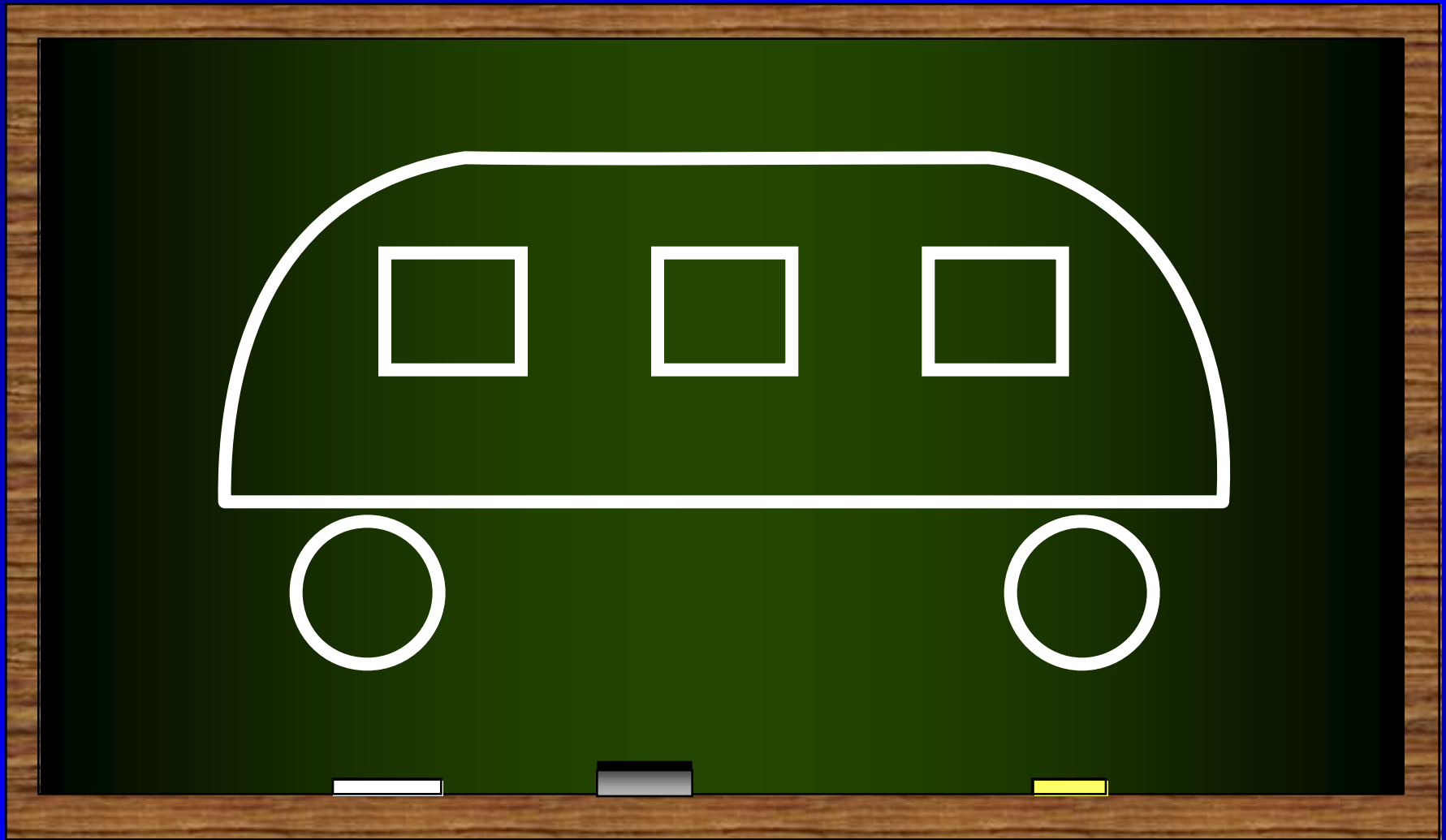
Are you smarter than
a Pre-schooler?



Which way is the bus traveling?
To the left or to the right?

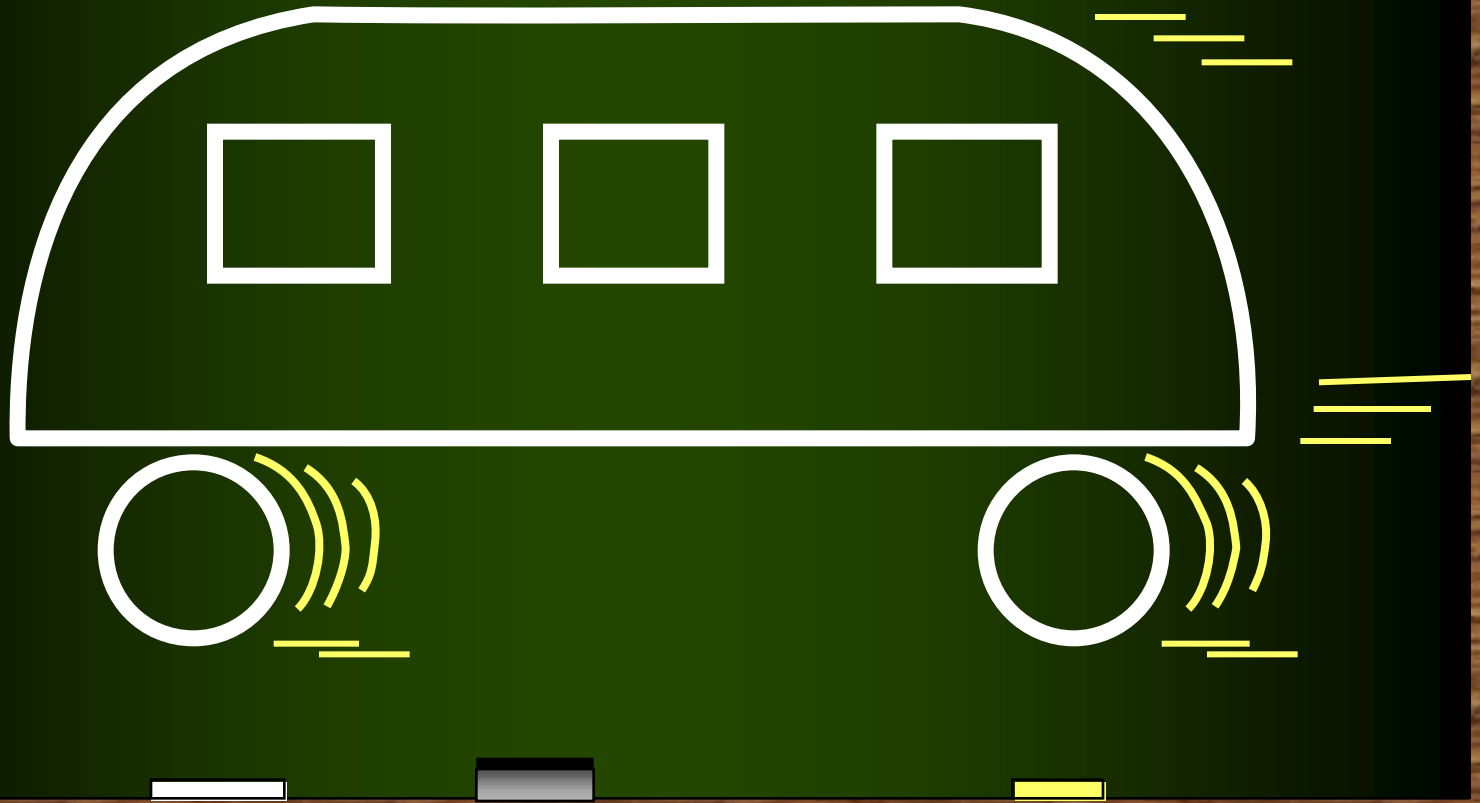


**Can't make up your mind?
Look carefully at the picture again.**



**Pre-schoolers all over the United States
were shown this picture and asked the same question.
90% of the pre-schooler's gave this answer.**

The bus is traveling to the left



When asked, "Why do you think the bus is traveling to the left?"

They answered:

"Because you can't see the door to get on the bus."

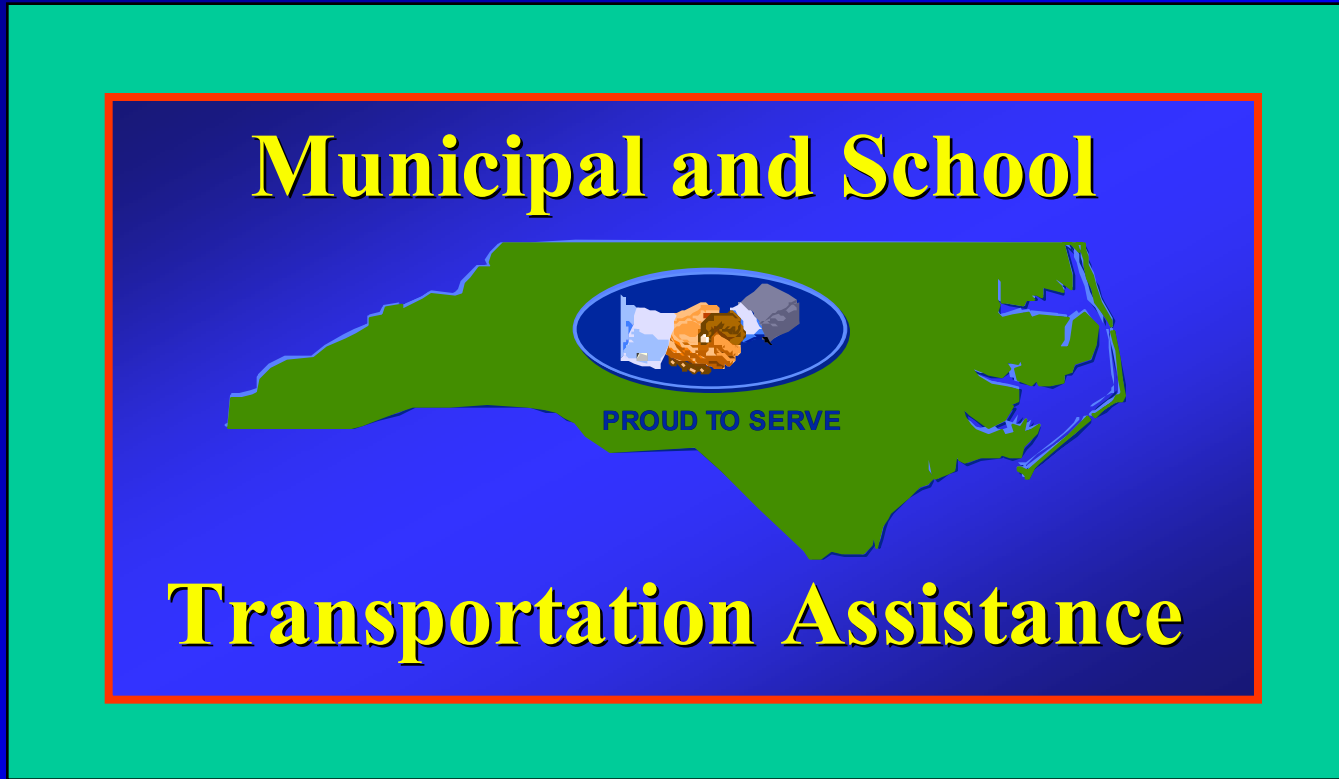
Do Schools have Traffic Concerns?



Not all students ride the School Bus



How can NCDOT help?



Address school traffic issues on existing campuses and proposed school site plans.

Visit our web site at **NCDOT.ORG** search for **MSTA**

When Reviewing A School MSTA Looks At Two Major Traffic Related Items

1 - On-campus

Minimum Vehicle Queue Length

(should include alternative traffic pattern, efficient student loading operations)

2 - Off-campus

Design and Safety of the Driveway(s)

(minimal impact to through traffic, proper sight distance, turn lanes if necessary)

On-campus

Adequate Driveway Length Analysis



On-campus

MSTA School Traffic Calculator

- School Traffic Volumes
- Minimum Queue Length for the student loading zone



School Name:

Is this a PUBLIC school? ☒ Yes ☐ No

Version: 101204

MSTA School Queue Input					Calculations				
Type School	Student Population	Number of Buses	Faculty Members	Student Drivers	I'M Total Vehicles	I'M Peak Vehicles	Minimum Queue Length	Total AM Trips	Total PM Trips
Elementary	<input type="text" value="600"/>	<input type="text" value="9"/>	<input type="text" value="75"/>		<input type="text" value="98"/>	<input type="text" value="45"/>	<input type="text" value="989"/>	<input type="text" value="523"/>	<input type="text" value="206"/>
Middle	<input type="text"/>	<input type="text"/>	<input type="text"/>		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
High	<input type="text"/>	<input type="text"/>	<input type="text"/>		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
					<input type="text" value="983"/>	<input type="text" value="523"/>	<input type="text" value="206"/>		

Elementary School Data				
AM Trips Generated				PM Trips Generated
Direction	Parents	Buses	Faculty	Trips
IN	<input type="text" value="219"/>	<input type="text" value="9"/>	<input type="text" value="75"/>	<input type="text" value="303"/>
OUT	<input type="text" value="219"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="219"/>
AM Elementary Trips				<input type="text" value="523"/>

Middle School Data				
AM Trips Generated				PM Trips Generated
Direction	Parents	Buses	Faculty	Trips
IN	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
OUT	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
AM Middle Trips				<input type="text"/>

High School Data				
AM Trips Generated				PM Trips Generated
Direction	Parents	Buses	Faculty	Trips
IN	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
OUT	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
AM High Trips				<input type="text"/>

Elementary School Data				
AM Trips Generated				PM Trips Generated
Direction	Parents	Buses	Faculty	Trips
IN	<input type="text" value="219"/>	<input type="text" value="9"/>	<input type="text" value="75"/>	<input type="text" value="303"/>
OUT	<input type="text" value="219"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="219"/>
AM Elementary Trips				<input type="text" value="523"/>

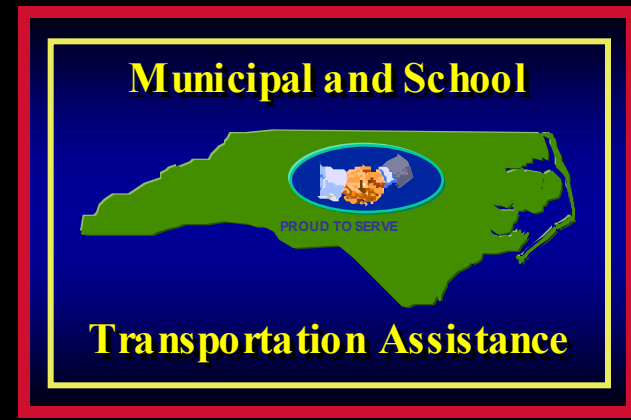
Middle School Data				
AM Trips Generated				PM Trips Generated
Direction	Parents	Buses	Faculty	Trips
IN	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
OUT	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
AM Middle Trips				<input type="text"/>

High School Data				
AM Trips Generated				PM Trips Generated
Direction	Parents	Buses	Faculty	Trips
IN	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
OUT	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
AM High Trips				<input type="text"/>

Total AM			
	In	Out	Total
AM AM Trips	<input type="text" value="303"/>	<input type="text" value="219"/>	<input type="text" value="523"/>

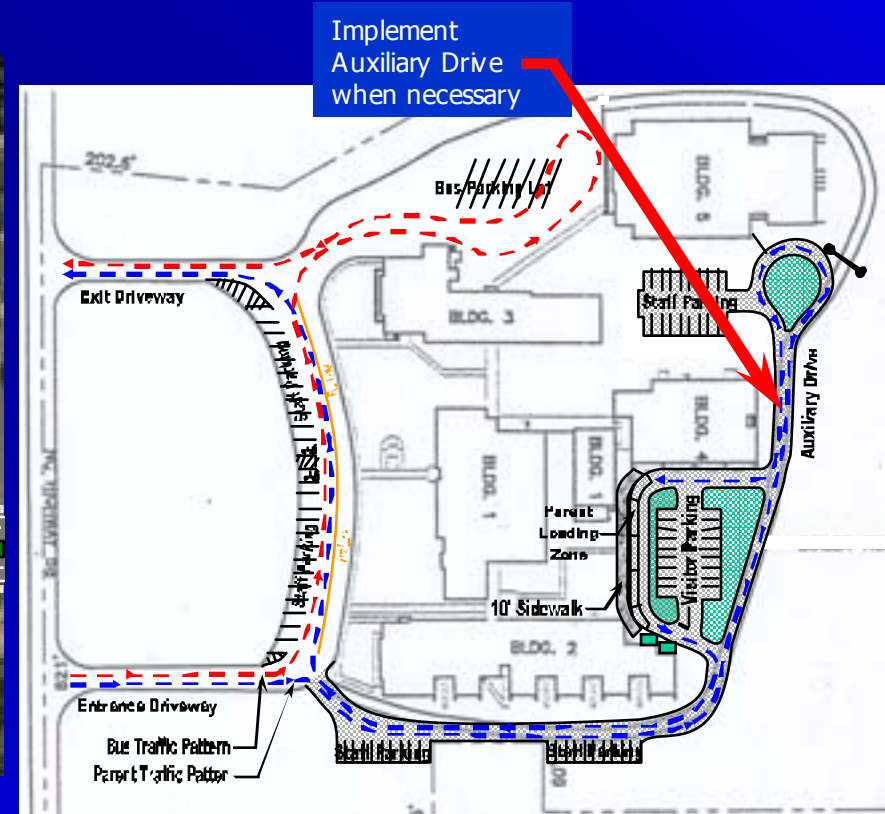
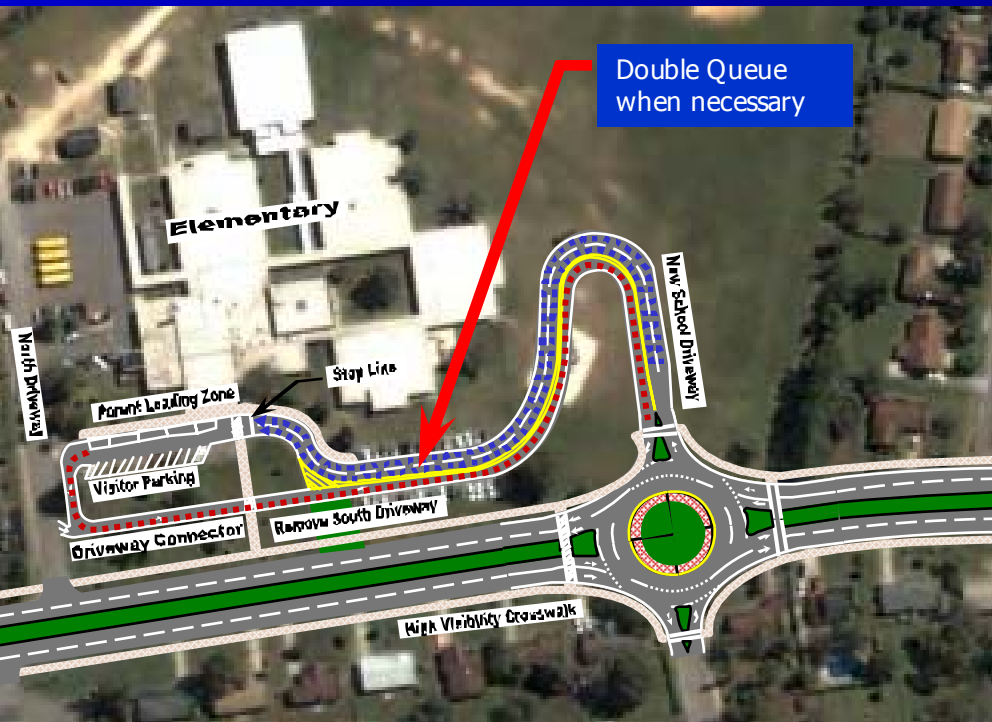
Total PM			
	In	Out	Total
PM PM Trips	<input type="text" value="188"/>	<input type="text" value="107"/>	<input type="text" value="295"/>

Beyond The Calculator



On-campus

Calculations reflect the minimum number of vehicles expected on an average day and does not take into consideration high traffic demand days and/or special events. To provide maximum safety for pedestrians and motorists during peak demands, the school is expected to have an alternative traffic flow plan that will prevent school related vehicles from presenting a hazard along nearby public streets.



On-campus

Loading Operations



Pedestrian Activities



Parking Lot Design



Helping School Transportation



Separate pedestrians and vehicle types

Organize student loading process

Assign short term "Visitor" parking

Reduce drivers options



Helping School Transportation



S

O

A

R

Assign short term visitor parking

Reduce drivers options

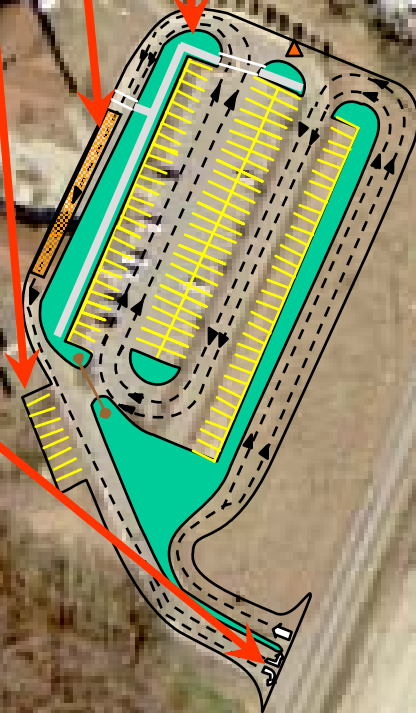


Separate Pedestrians and vehicle types

Organize student loading process

Assign short term “visitor” parking

Reduce drivers options with
traffic pattern



Off-campus

Analysis at school driveway(s)
and nearby intersections



Off-campus

Every School wants a traffic signal



School traffic will rarely meet signal warrants and will likely not address the school traffic safety concerns.

Off-campus

A Traffic Director may be utilized



Off-campus

But a Traffic Director may not be the safest option



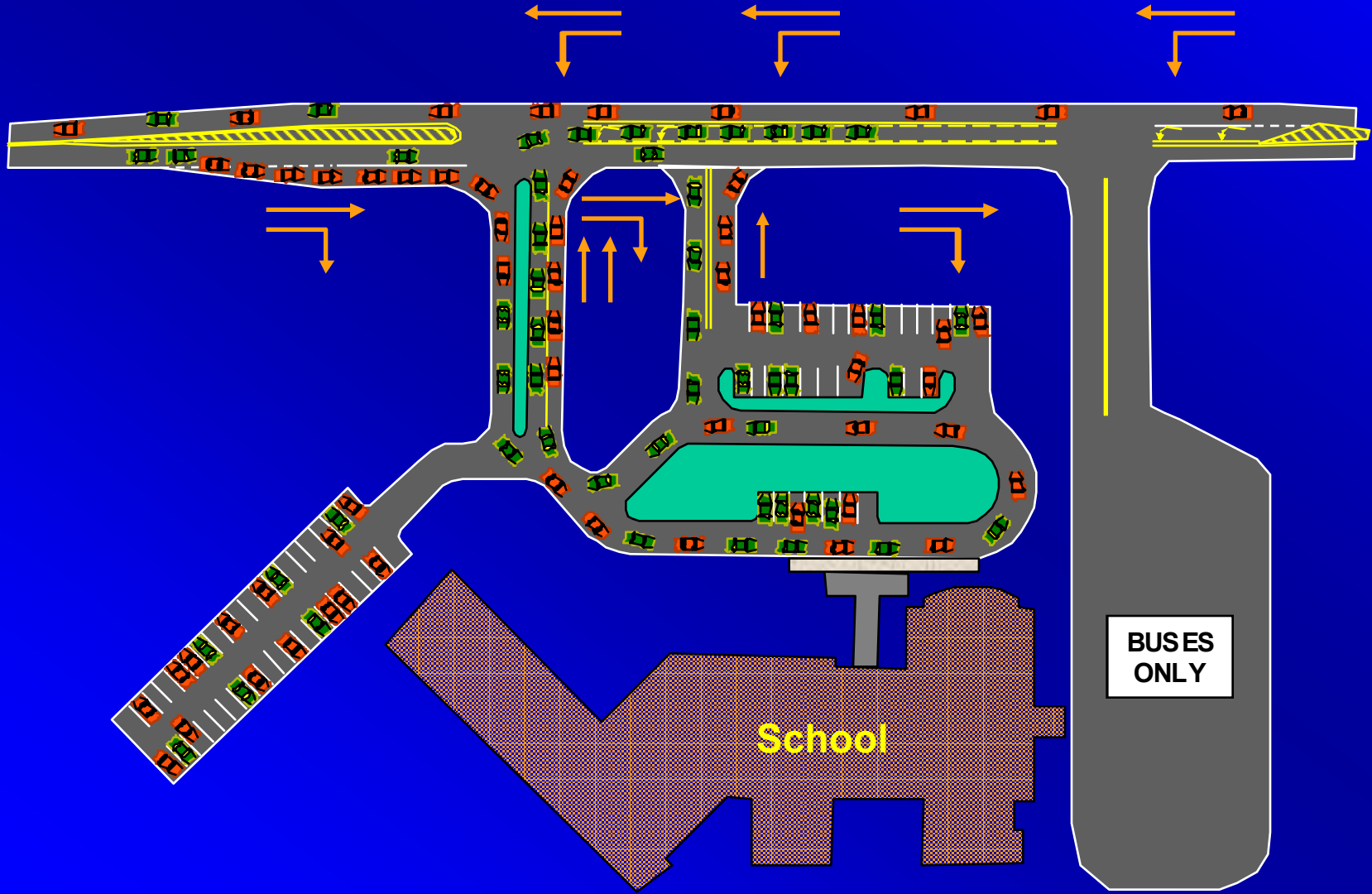
Off-campus

Providing turn lanes don't always help



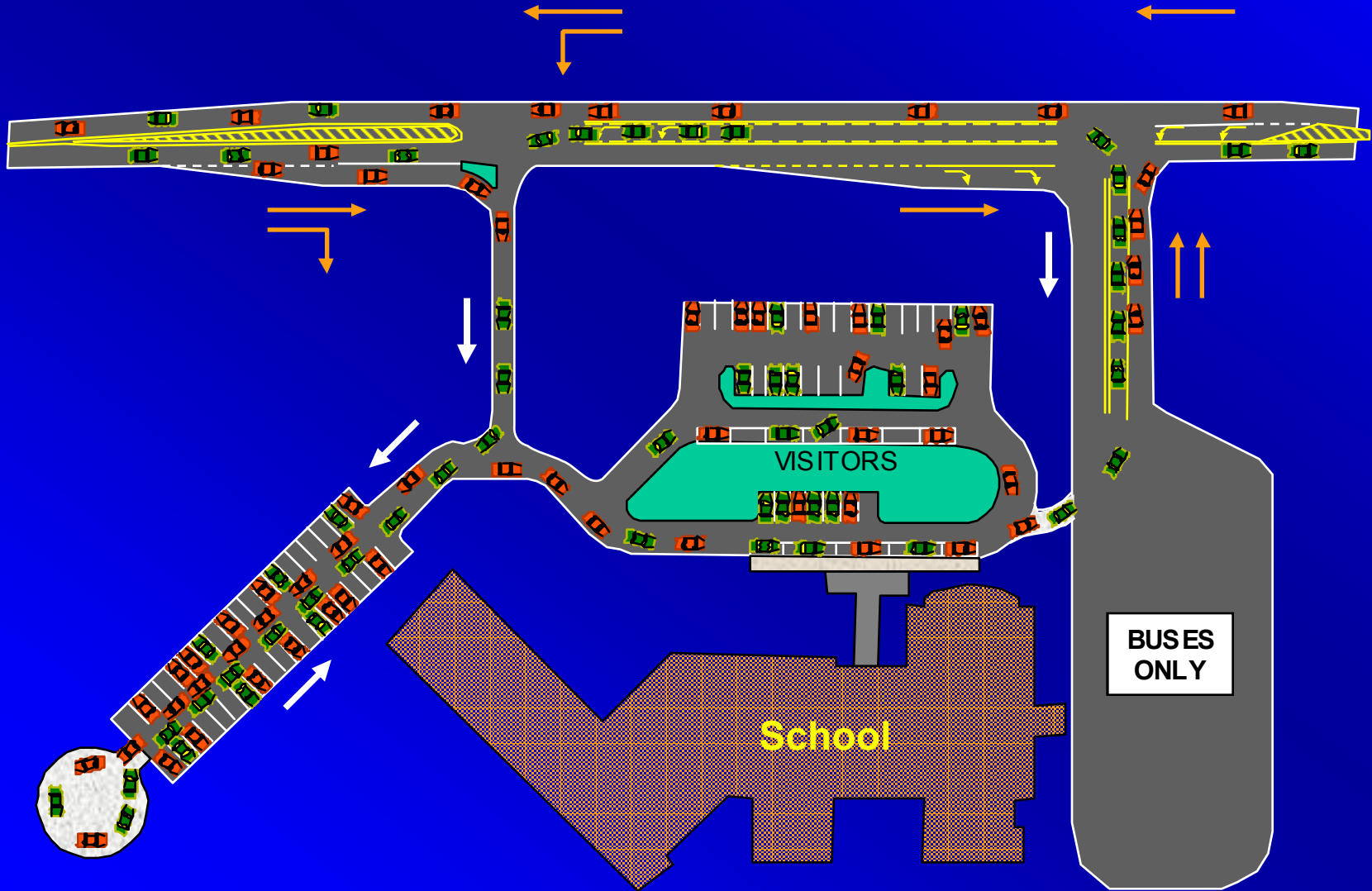
Off-campus

Reducing the number of driveways, one-way traffic operations, and channelized right turn lane

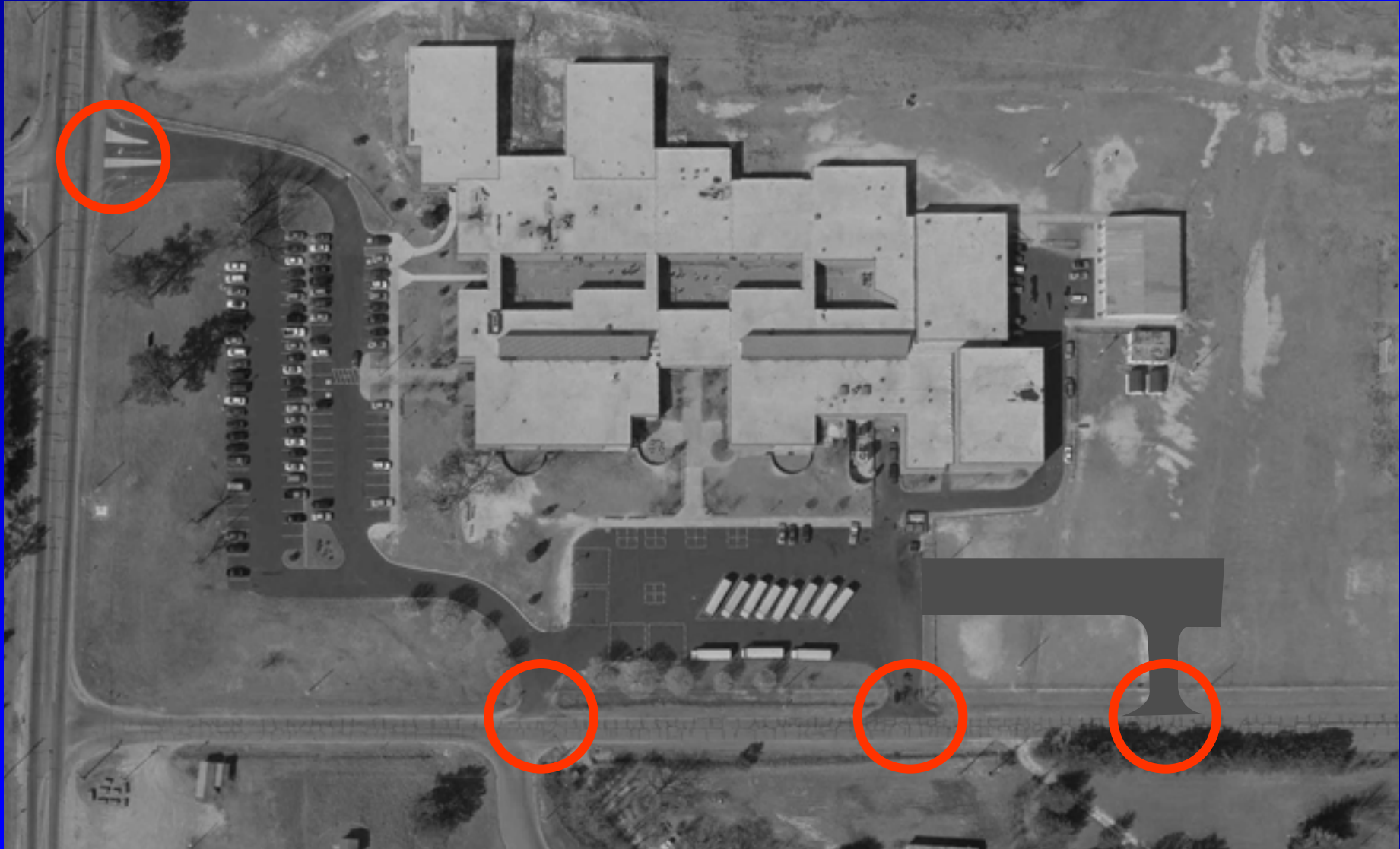


Off-campus

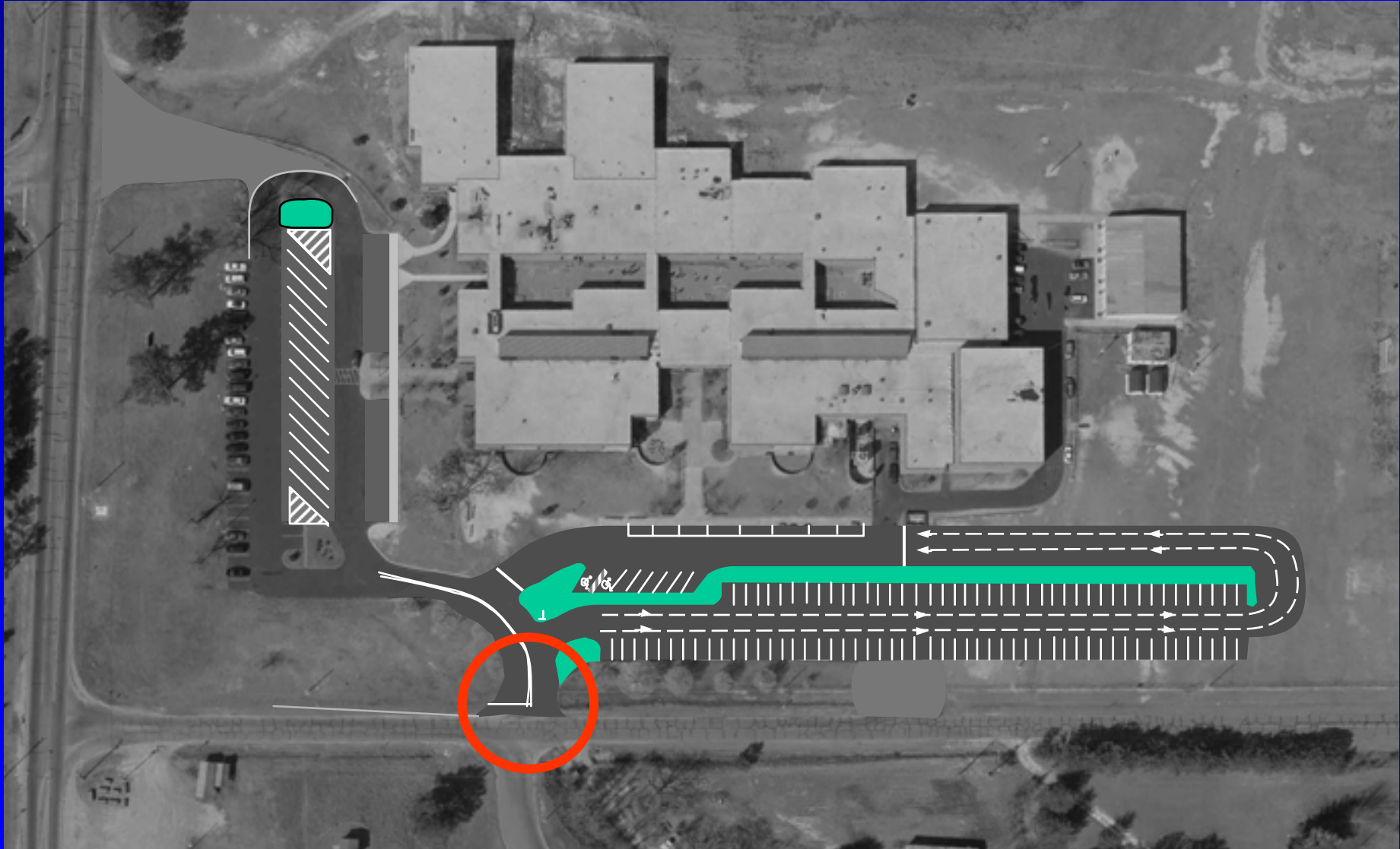
Reducing the number of driveways, one-way traffic operations, and channelized right turn lane



Reduce the number of driveways/drivers options



Reduce the number of driveways/drivers options



Off-campus

Don't forget the transportation needs for today's student



Connectivity to nearby neighborhoods

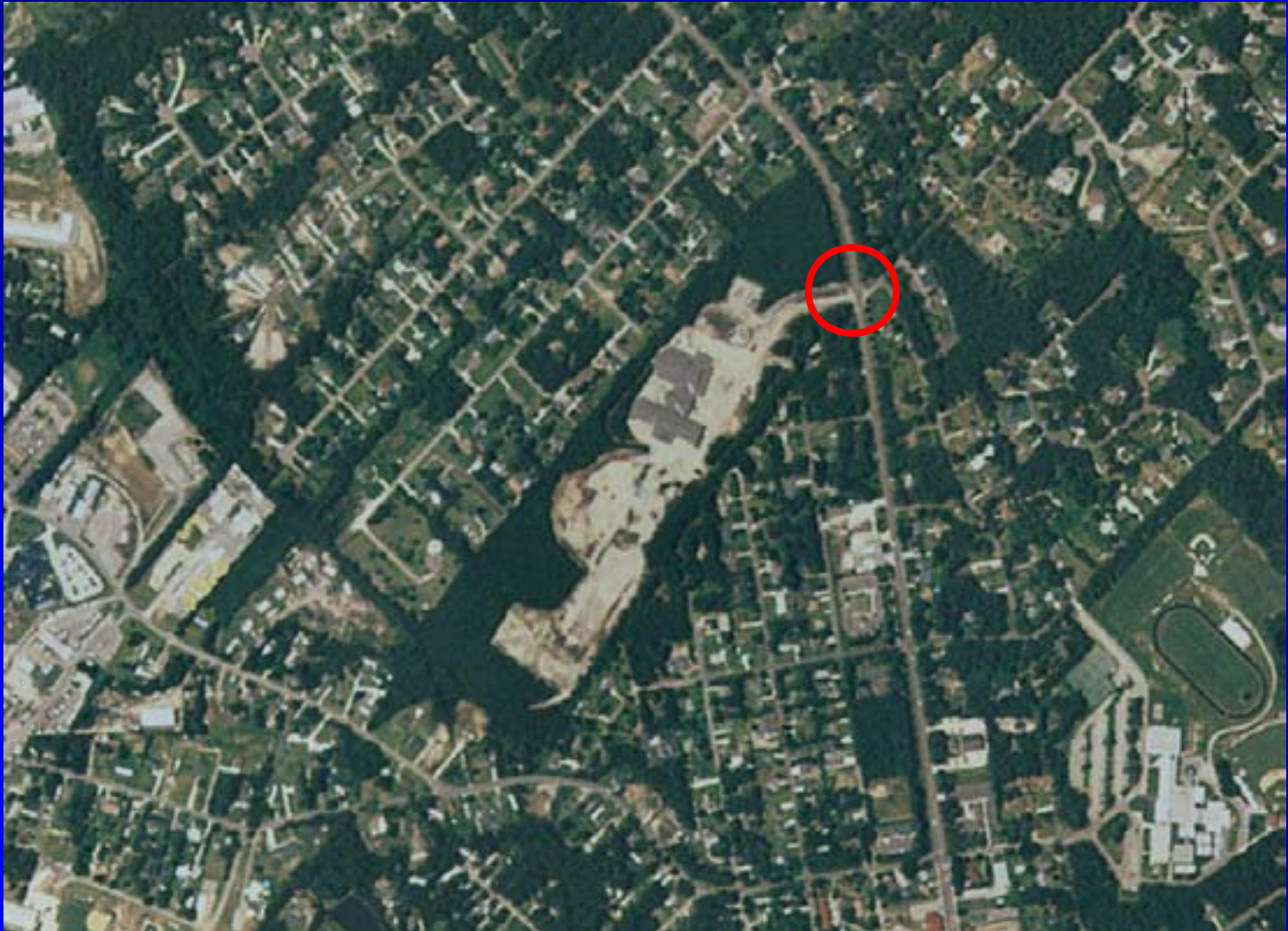
Off-campus

Are all Pedestrian Crosswalks assessable?



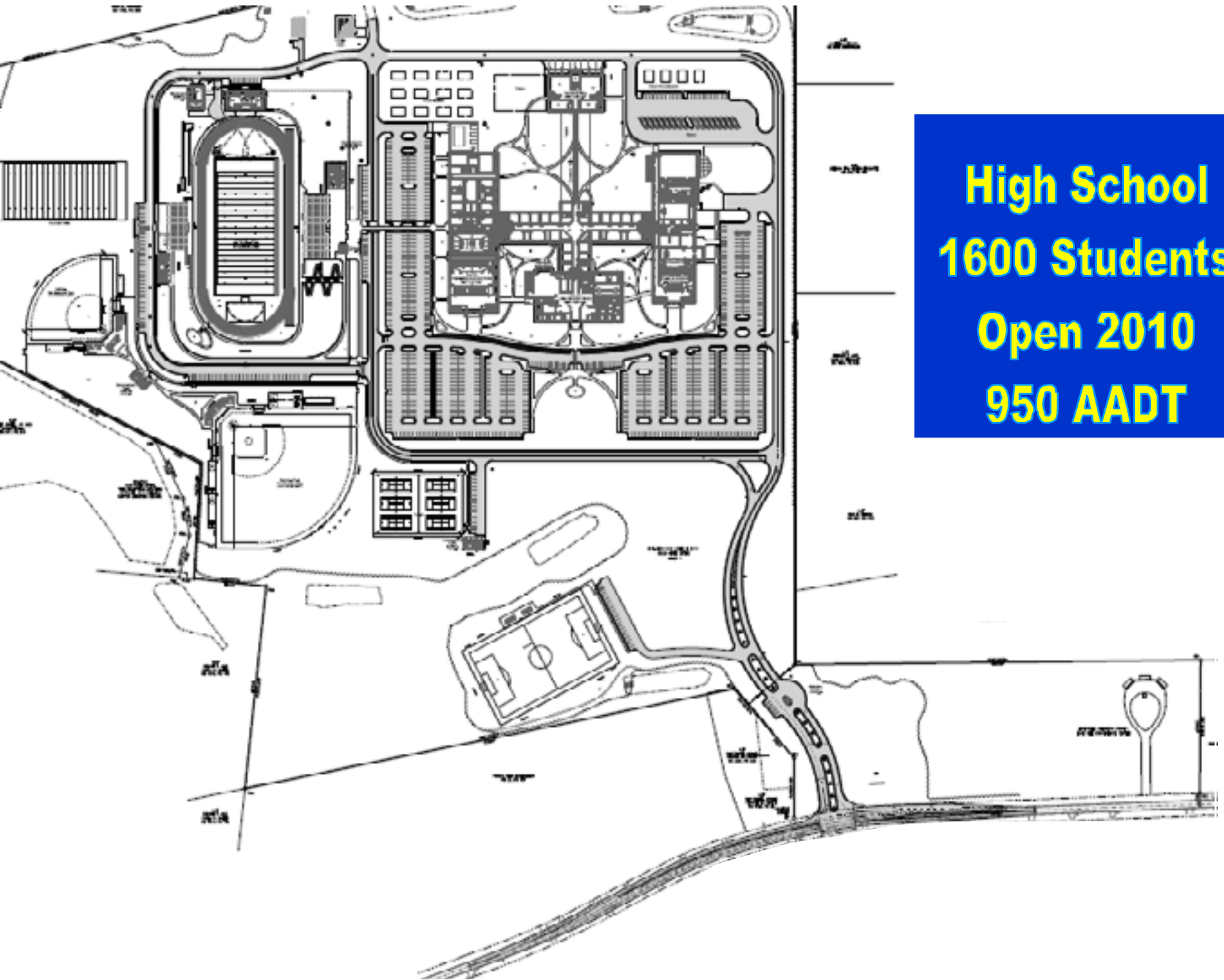
Off-campus

Providing a Walkable Community



An example of a School Campus Design





High School
1600 Students
Open 2010
950 AADT

MSTA Calculator

School Name:

Is this a PUBLIC school? ☒ Yes ☐ No Version:

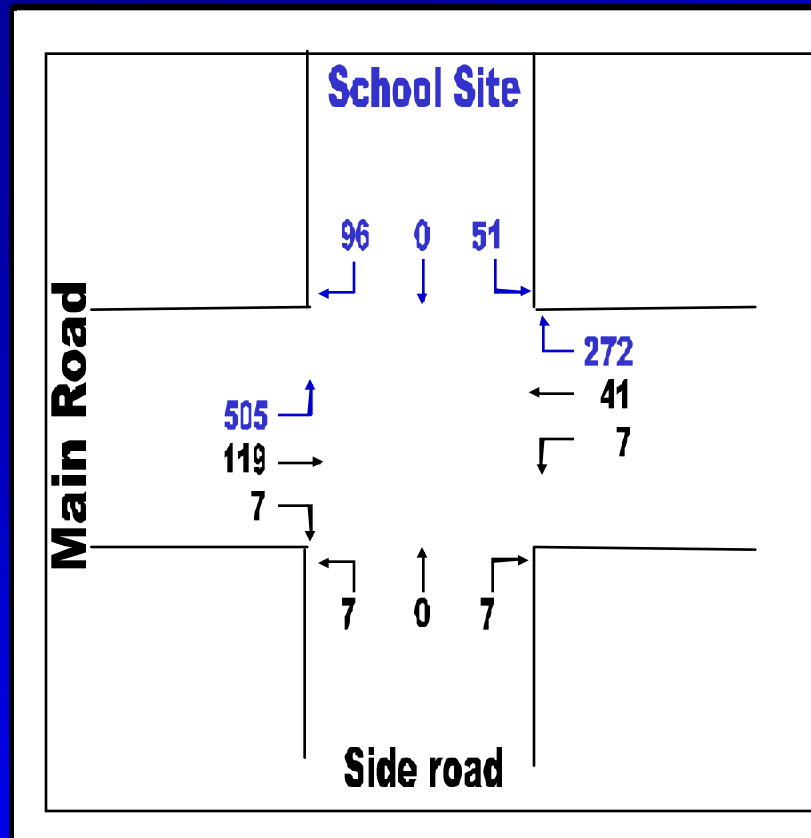
MSTA School Queue Input					Calculations				
Type School	Student Population	Number of Buses	Staff Members	Student Drivers	PM Total Vehicles	PM Peak Vehicles	Minimum Queue Length	Total AM Trips	Total PM Trips
Elementary	<input type="text"/>	<input type="text"/>	<input type="text"/>						
Middle	<input type="text"/>	<input type="text"/>	<input type="text"/>						
High	1600	25	147	458	69	38	939	924	621
		25	147	458			939	924	621

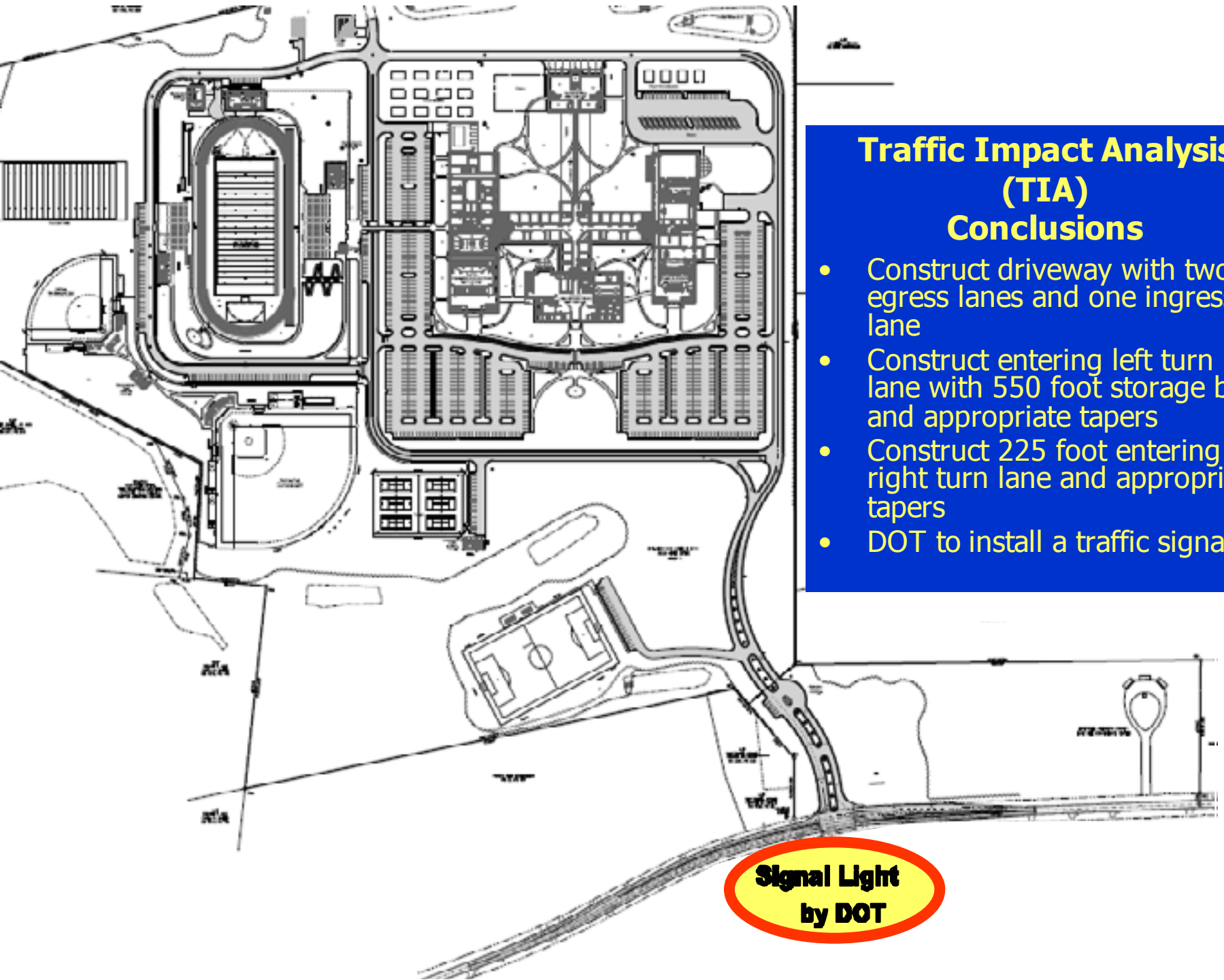
Elementary School Data								
AM Trips Generated					PM Trips Generated			
Direction	Parents	Buses	Staff	Trips	Parents	Buses	Staff	Trips
IN								
OUT								
		AM Elementary Trips				PM Elementary Trips		

	Middle School Data							
	AM Trips Generated				PM Trips Generated			
Direction	Parents	Buses	Staff	Trips	Parents	Buses	Staff	Trips
IN								
OUT								
		AM Middle Trips				PM Middle Trips		

High School Data											
AM Trips Generated						PM Trips Generated					
Direction	Parents	Buses	Staff	Student Drivers	Trips	Parents	Buses	Staff	Student Drivers	Trips	
IN	147	25	147	458	777	69				69	
OUT	147				147	69	25		458	562	
			AM High Trips		924				PM High Trips		621

TIA Peak Hour Traffic 2012





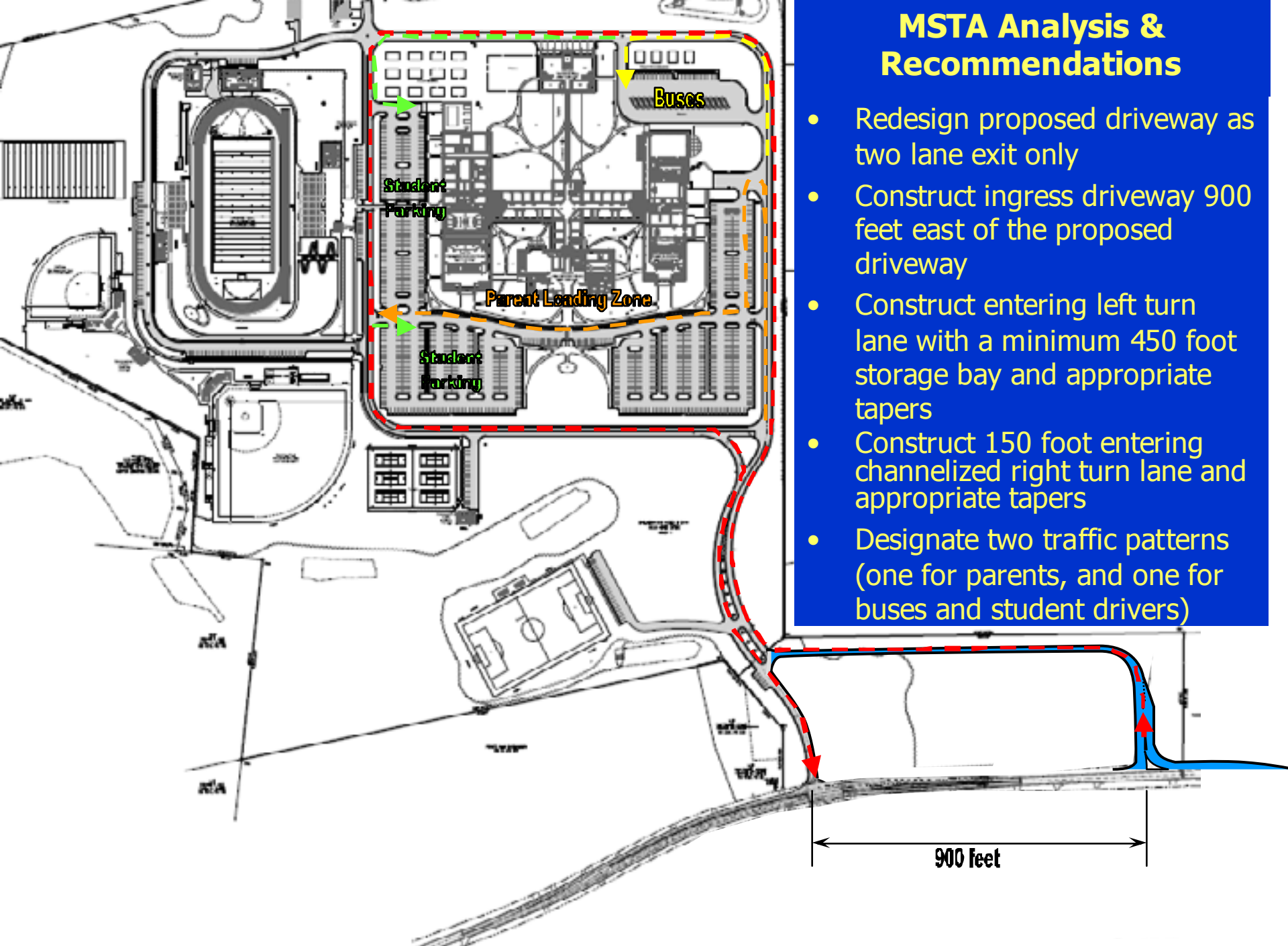
Traffic Impact Analysis (TIA) Conclusions

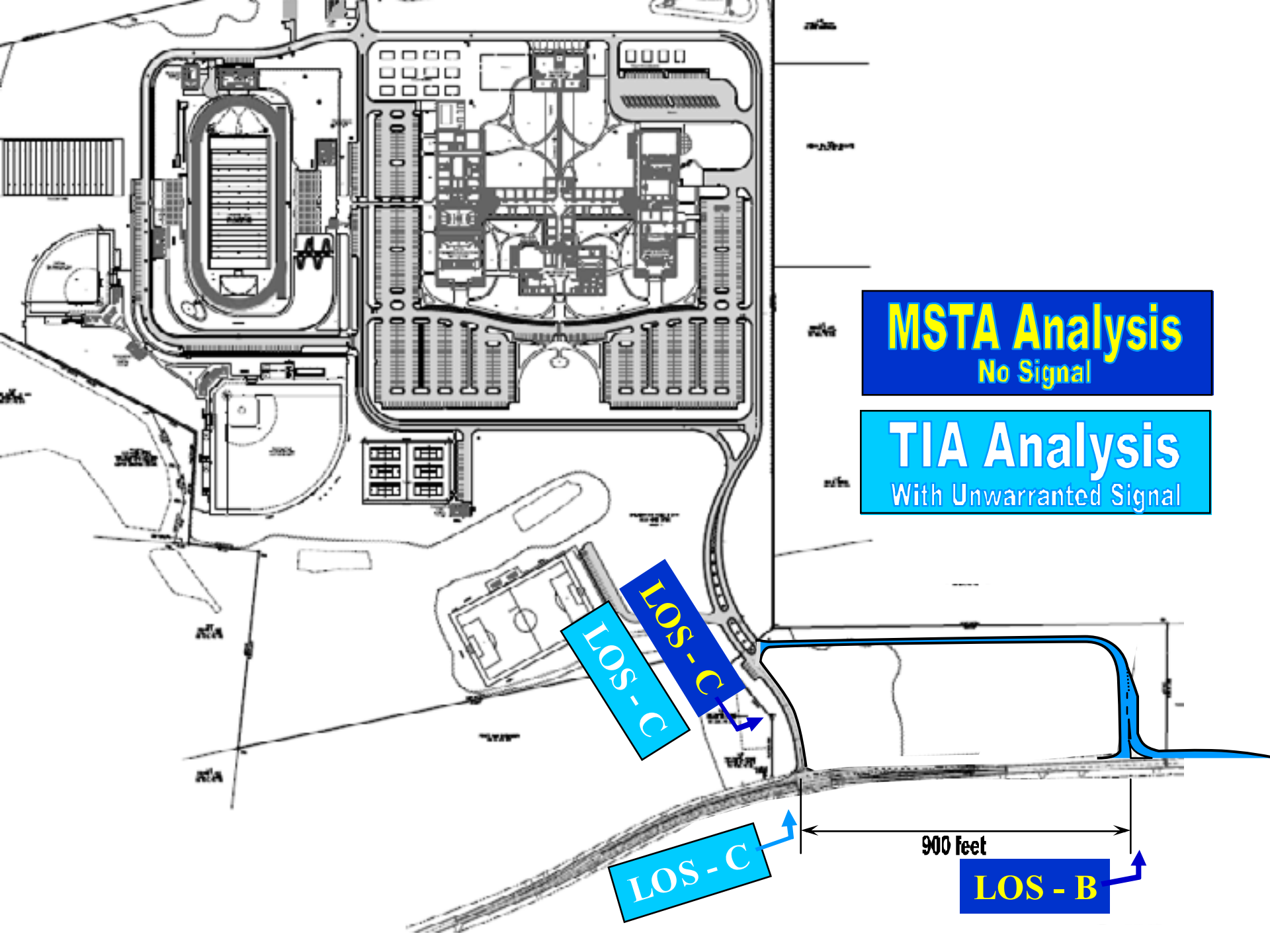
- Construct driveway with two egress lanes and one ingress lane
- Construct entering left turn lane with 550 foot storage bay and appropriate tapers
- Construct 225 foot entering right turn lane and appropriate tapers
- DOT to install a traffic signal

**Signal Light
by DOT**

MSTA Analysis & Recommendations

- Redesign proposed driveway as two lane exit only
- Construct ingress driveway 900 feet east of the proposed driveway
- Construct entering left turn lane with a minimum 450 foot storage bay and appropriate tapers
- Construct 150 foot entering channelized right turn lane and appropriate tapers
- Designate two traffic patterns (one for parents, and one for buses and student drivers)





MSTA Analysis
No Signal

TIA Analysis
With Unwarranted Signal

LOS - C

LOS - C

LOS - B

900 feet



Any Questions?

Municipal and School



Transportation Assistance

and You

Working Together

To Provide

Safe Roads to Safe Schools